

Amendment to the Claims

1. (currently amended) A device comprising:

a nanotube having a substantially cylindrical wall hollow cylindrical shape, wherein said nanotube has an exterior and interior cylindrical surfaces, said exterior cylindrical surface has having a diameter that is less than one micron, said nanotube has two ends, and a length between the two ends measured in a direction perpendicular to the diameter; and

a magnetic nanoparticle that is attached to the nanotube and not encircled by the wall the exterior cylindrical surface of the nanotube, the magnetic nanoparticle having a longest dimension that is less than one micron.

2. (currently amended) The device of claim 1, further comprising a plurality of magnetic nanoparticles that are attached to the nanotube and not encircled by the wall the exterior cylindrical surface of the nanotube.

3. (original) The device of claim 2, wherein the magnetic nanoparticles are superparamagnetic.

4. (original) The device of claim 1, wherein the nanoparticle contains an element selected from the group consisting of cobalt, nickel and iron.

5. (original) The device of claim 1, wherein the nanoparticle is attached to the nanotube by an electrostatic or hydrophobic interaction with a carbonyl, carboxyl, hydroxyl or sulfate functional group.

6. (cancelled).

7. (cancelled).

8. (cancelled).

9. (cancelled).

10. (cancelled).

11. (cancelled).

12. (cancelled).

13. (cancelled).

14. (cancelled).

15. (cancelled).

16. (cancelled).

17. (cancelled).

18. (cancelled).

19. (cancelled).

20. (cancelled).

21. (cancelled).

22. (currently amended) A transistor comprising:

a source;

a drain;

a gate;

a channel, the channel including a nanotube having a substantially cylindrical wall, wherein the nanotube has a submicron diameter and an elongate dimension that is substantially perpendicular to the diameter, hollow cylindrical shape, wherein said nanotube has an exterior and interior cylindrical surfaces, said exterior cylindrical surface has a diameter that is less than one micron, said nanotube has two ends, and a length between the two ends measured in a direction perpendicular to the diameter, and the nanotube is disposed between the source and the drain; and is substantially aligned along the shortest distance between the source and the drain, and the nanotube has at least one magnetic nanoparticle attached to the exterior cylindrical surface.

23. (cancelled).

24. (currently amended) A sensor device for detecting biological or chemical molecules comprising:

a plurality of conductive electrodes;

a single or plurality of nanotube channels connecting the electrodes, wherein the nanotubes having substantially cylindrical wall hollow cylindrical shape, wherein said nanotube has an exterior and interior cylindrical surfaces, said exterior cylindrical surface has a diameter that is less than one micron, said nanotube has two ends, and a length between the two ends measured in a direction perpendicular to the diameter, said nanotube channels are substantially aligned with each other and with respect to the edges of the electrodes, and each nanotube has at least one magnetic nanoparticle attached to the exterior cylindrical surface.

25. (cancelled).

26. (currently amended) An electronic apparatus comprising

a plurality of electronic devices; and

a plurality of conductive interconnects that are connected between the electronic devices, each of the conductive interconnects including a nanotube having a substantially cylindrical wall, having a submicron diameter and a length measured in a direction perpendicular to the diameter, hollow cylindrical shape, wherein said nanotube has an exterior and interior cylindrical surfaces, said exterior cylindrical surface has a diameter that is less than one micron, said nanotube has two ends, and a length between the two ends measured in a direction perpendicular to the diameter, the length being greater than the diameter, and each nanotube has at least one magnetic nanoparticle attached to the exterior cylindrical surface.

27. (cancelled).

28. (currently amended) The electronic apparatus of claim 26, wherein the electronic devices include a magnetic random access memory (MRAM) cell, and the conductive interconnects are fabricated by at least one of the methods of claim 6 through claim 21, inclusive.